Stadtman Biographies

Biographies

Anfinsen, Christian Boehmer (1916-1995) American biochemist

Anfinsen was educated at Swarthmore College, the University of Pennsylvania, and Harvard, where he obtained his Ph.D. in 1943. Subsequently he taught at Harvard Medical School until 1950. He then moved to the National Heart Institute at Bethesda, Maryland, where he served as chief of the laboratory of cellular physiology. In 1963 Anfinsen joined the National Institute of Arthritis and Metabolic Diseases, another institute within the National Institutes of Health, as chief of the laboratory of chemical biology. In 1982 he moved to the Johns Hopkins University as professor of biology.

By 1960 Stanford Moore and William Stein had determined fully the sequence of the 124 amino acids in ribonuclease, the first enzyme to be so analyzed. Anfinsen, however, was more concerned with the shape and structure of the enzyme and the forces that permitted it always to adopt the same unique configuration. He found that minimal chemical intervention—merely putting the enzyme into a favorable environment—was sufficient to induce "denatured" ribonuclease, which has lost its three-dimensional shape without the rupture of peptide bonds, to adopt the one configuration that restores enzymatic activity. The important conclusion that Anfinsen drew from this observation was that all the information for the assembly of the three-dimensional protein must be contained in the protein's sequence of amino acids—its primary structure. He went on to show similar behavior in other proteins. For this work, Anfinsen shared the 1972 Nobel Prize in Chemistry with Moore and Stein.

Source

John Daintith, et al. eds. Biographical Encyclopedia of Scientists, 2nd ed. Bristol and Philadelphia: Institute of Physics Publishing, 1994.
Hazel Muir, ed. Larousse Dictionary of Scientists. New York: Larousse, 1994

Additional Readings or Websites

Alan N. Schechter. "Christian B. Anfinsen, 1916-1995." Nature Structural Biology 8 (1995): 621-3.
Profiles in Science
Nobel e-Museum
Nature Encyclopedia of Life Sciences

Back to top

Ames, Bruce N. (1928-) American biochemist and geneticist

Ames attended Cornell University from 1946 to 1950, receiving his B.A. degree in chemistry/biochemistry. He then moved to the California Institute of Technology for his graduate study under Herschel K. Mitchell, a former postdoctoral fellow of George Beadle, in the biology department. Ames worked on the biosynthesis of histidine in Neurospora. After taking his Ph.D. within three years, he came to the National Institute of Arthritis and Metabolic Diseases in 1953 as a Public Health Service fellow. There he isolated the enzymes involved in the histidine pathway, and began to work on gene regulation in histidine biosynthesis using Salmonella. Collaborating with Philip Hartman of the Johns Hopkins University, Ames showed that the histidine genes could be overexpressed if histidine availability limited the growth rate. He also demonstrated that the cluster of genes was controlled together as a unit by a regulatory sequence. In 1962, Ames became a section head in the newly created laboratory of molecular biology led by Gordon Tomkins.

Ames is perhaps best known for the "Ames test," the test he developed for chemical mutagens. Mutagens are agents that tend to increase the frequency or extent of genetic mutation. The Ames test, which uses a rapid and inexpensive bacterial assay for mutagenicity, complements epidemiologic surveys and animal tests that are necessarily slower, more laborious, and far more expensive. Ames began to work on this test in 1964, and after moving to the University of California, Berkeley, as professor of biochemistry in 1967, he continued to improve the sensitivity of the test. The Ames test has been used extensively to help evaluate the mutagenic and carcinogenic risks of a large number of chemicals. In the 1980s, Ames' research interest shifted to the question of aging and showed the role of mitochondrial decay as a major contributor to aging and age-related degenerative diseases. He is a recipient of the National Medal of Science and a member of the National Academy of Sciences.

Source

Bruce N. Ames. "An Enthusiasm for Metabolism." Journal of Biological Chemistry 278 (2003): 4369-80.

Back to top

Barker, Horace Albert (1907-2000) American biochemist

Horace Albert Barker, informally called "Nook," was educated at Stanford University and earned a Ph.D. in chemistry in 1933. His research interest then turned to soil microbiology and microbial biochemistry. He set out on a two-year postdoctoral fellowship to study first with C. B. van Niel at the Hopkins Marine Station, Pacific Grove, California, and then a year in the Netherlands to study with van Niel's mentor, A. J. Kluyver in Delft. There he initiated an investigation that would later lead him to discover vitamin B12 coenzymes. In 1936 Barker started his academic career at the University of California, Berkeley as an instructor in soil microbiology, and he became professor of soil microbiology in 1946. His official title was periodically changed until 1959 when he became a professor in the new department of biochemistry. A building on the Berkeley campus was named after him in 1988.

Barker made major contributions to the study of bacterial metabolism, particularly in the synthesis and oxidation of fatty acids, the fermentation of amino acids and purines, and carbohydrate transformations. He was also well known for his pioneering use of radioactive carbon-14 tracers in biochemical research in the mid 1940s and for his work on the biochemical function of vitamin B12 in the late 1950s. Barker was also influential as a teacher and a mentor. As a student in his laboratory once wrote: "He teaches the course the way everyone imagines their favorite grandfather would do it." Barker was a member of the National Academy of Sciences and a recipient of the National Medal of Science.

Source

Clinton E. Ballou. "Horace Albert Barker, Biochemistry: Berkeley." University of California: In Memoriam, 2001.

Daniel E. Koshland, Jr. "Horace Barker," California Alumni Association at U.C. Berkeley (Oct. 26, 2003).

Additional Readings

Horace A. Barker. "Exploration of Bacterial Metabolism." Annual Review of Biochemistry 47 (1978): 1-33
King-Thom Chung. "Horace A. Barker (1907) Pioneer of Anaerobic Metabolism." Anaerobe 5 (1999): 513-7.

Back to top

Beijerinck, Martinus W. (1851-1931) Dutch microbiologist

Educated at the Delft Technical School and the University of Leiden (Ph.D. 1899), Beijerinck taught in agricultural schools, worked in the Netherlands Yeast and Alcohol Manufactory (1884-95), and taught at the Technical School in Delft (1895-1921). His research on the biology of gall wasps and gall formation in1882 led to the theory of ontogeny in higher plants and animals as being controlled by a series of growth enzymes that become active in fixed succession. He made major contributions to microbiology by developing the enrichment culture technique, simultaneously with Sergey Winogradsky, which permits the isolation of highly specialized microorganisms. Beijerinck cultivated and isolated Rhizobium leguminosarum, a bacillus that fixes free nitrogen and causes the formation of nodules on the roots of Leguminosae. He also characterized Azobacter as nitrogen-fixing, and isolated the new genus, Aerobacter. In studying tobacco mosaic disease, he concluded that the filterable pathogen was a contagium vivum fluidum, a term coined to convey his concept of a living infectious agent in a fluid (noncellular) form—a revolutionary idea at a time when life and cellularity were thought to be inextricably connected.

Source

James F. Mauer, et al., eds. Concise Dictionary of Scientific Biography. New York: Charles Scribner & Sons, 1981.

Additional Readings or websites

Pieter Bos and Bert Theunissen, eds. Beijerinck and the Delft School of Microbiology. Delft: Delft University Press, 1995.

Back to top

Berzelius, Jöns Jacob (1779-1848) Swedish chemist

Berzelius's early life was marked by a struggle to obtain a satisfactory education. In 1796 he entered the University of Uppsala but his studies were interrupted because of lack of funds. He began his chemical experiments without any official encouragement and from 1799 he worked during the summers as a physician at Medevi Springs where he analyzed the waters. He finally obtained his M.D. in 1802 with a dissertation on the medical uses of the voltaic pile. After graduating, Berzelius moved to Stockholm where he did research with Wilhelm Hisinger, a mining chemist. Their fist success came in 1803 with the isolation of cesium, although the discovery was anticipated by Martin Klaproth. Berzelius later discovered selenium (1817), thorium (1828), and his coworkers discovered lithium (1818) and vanadium (1830). In 1807 Berzelius was appointed professor at the School of Surgery in Stockholm (later the Karolinska Institute).

Berzelius was a meticulous experimenter and systematizer of chemistry. His early work was on electrochemistry, and he developed a "dualistic" view of compounds, in which they were composed of positive and negative parts. He was an ardent supporter of John Dalton's atomic theory. From 1835 Berzelius's rigid adherence to the dualistic theory proved less fruitful in the study of organic chemistry. He was an inventor of much familiar chemical apparatus, including rubber tubing and filter papers. He also introduced the modern chemical symbols represented by letters. He had a knack of coining words for phenomena and substances—the terms "catalysis," "protein," and "isomerism" were all introduced by him.

Source

John Daintith, et al. eds. Biographical Encyclopedia of Scientists, 2nd ed. Bristol and Philadelphia: Institute of Physics Publishing, 1994.

Additional Readings

Alan J. Rocke. Chemical Atomism in the Nineteenth Century: From Dalton to Cannizzaro. Columbus: Ohio State University Press, 1984.

Back to top

Brown, Michael Stuart (1941-) American biochemist and molecular geneticist

Brown earned his B.A. from the University of Pennsylvania in 1962, and received his M.D. in 1966. After an internship at the Massachusetts General Hospital in Boston (1966-68), he came to the National Institutes of Health as a Clinical Associate and worked in Earl Stadtman's laboratory of biochemistry for three years. In 1971 he was appointed assistant professor at the University of Texas Southwestern Medical School, Dallas, and in 1977 he became professor of genetics and director of the Center of Genetic Diseases.

Brown's research interests have included digestive enzymes, particularly their role in the metabolism of cholesterol. However, he is perhaps best known for his studies of lipid receptors on body cells and their importance in removing cholesterol from the blood. Cholesterol is produced by mammalian cells as well as being taken up into cells from food. It is carried in the bloodstream by proteins called LDLs (low-density lipoproteins. commonly known as "bad cholesterol"). Brown worked on the genetic disease hypocholesterolemia. He found that sufferers from the disease lack a receptor on their cell surfaces to which the LDLs bind, and that this problem results in abnormally high levels of cholesterol in the bloodstream. Brown's research on cholesterol was done in collaboration with Joseph Goldstein, with whom he has had a long and fruitful scientific partnership since 1966. In 1984 Brown and Goldstein elucidated the gene sequence which codes for the LDL receptor, and opened up the possibility of synthesizing drugs to control cholesterol metabolism. They were jointly awarded the 1985 Nobel Prize in Physiology or Medicine.

Source

John Daintith, et al. eds. Biographical Encyclopedia of Scientists, 2nd ed. Bristol and Philadelphia: Institute of Physics Publishing, 1994.
Hazel Muir, ed. Larousse Dictionary of Scientists. New York: Larousse, 1994.

Additional Readings or Websites

Nobel e-Museum

Back to top

Hodgkin, Dorothy Crowfoot (1910-1994) British crystallographer

Dorothy Crowfoot, as she was born, was educated at Somerville College, Oxford. After a brief period as a postgraduate student at Cambridge University, she returned to Oxford in 1934 and spent her entire academic career there. After various appointments within the university, she became the first Royal Society Wolfson Research Professor at Oxford in 1960.

Hodgkin had the good fortune to fall under the influence of the inspiring and scientifically imaginative physicist J. D. Bernal at Cambridge, who opened the way to investigate complex organic molecules with the technique of X-ray diffraction analysis. Hodgkin's first major result came in 1949 when, with Charles Bunn, she published the three dimensional structure of penicillin. This was followed by the structure of vitamin B12 in 1956 and that of insulin in 1969. For her work on vitamin B12, Hodgkin was awarded the Nobel Prize in Chemistry in 1964.

Source

John Daintith, et al. eds. Biographical Encyclopedia of Scientists, 2nd ed. Bristol and Philadelphia: Institute of Physics Publishing, 1994.

Additional Readings or Websites

Georgina Ferry. Dorothy Hodgkin: A Life. New York: Cold Spring Harbor Laboratory Press, 1998.
Nobel e-Museum

Back to top

Kluyver, Albert Jan (1888-1956) Dutch microbiologist

Kluyver received a chemical engineering degree from the Technical School of Delft in 1910. Later, in 1922, he was appointed the chair of general and applied microbiology at the same school, the position he held until his death. He greatly influenced the chemical study of microorganisms. His most important contribution was the statement that hydrogen transfer (the process of oxidation) is a fundamental feature of all metabolic processes. During World War II, he studied microbial morphology using an electron microscope. He had considerable interest in commercial applications, and collaborated with the Netherlands Yeast and Alcohol Manufactory in Delft.

Source

Hazel Muir, ed. Larousse Dictionary of Scientists. New York: Larousse, 1994

Additional Readings or Websites

A. F. Kamp, et al., eds. Albert Jan Kluyver: His Life and Work. Amsterdam and New York:, 1959.

Back to top

Lipmann, Fritz Albert (1899-1986) German-American biochemist

Lipmann was educated at the Universities of Königsberg and Berlin, earning his M.D. in 1922 and his Ph.D. in 1927. He then worked with Otto Meyerhof in Heidelberg and taught at the Kaiser Wilhelm Institute in Berlin (1927-31), but with the rise of the Nazis he decided to accept a position at the Carlsberg Foundation in Copenhagen. In 1939 Lipmann moved to America, where he worked at the Cornell Medical School (1939-41), Harvard (1941-49), and the Massachusetts General Hospital in Boston (1949-57), before becoming professor of biochemistry at the Rockefeller Institute for Medical Research in New York, a post he occupied until his retirement in 1970.

Working on the breakdown of glucose by a particular bacterium in 1937, Lipmann found that a certain oxidation would not proceed without the addition of some phosphate. Later he discovered that adenosine triphosphate (ATP) is the source of the phosphate that delivers the energy. He introduced the controversial "~" symbol to indicate a "high-energy" phosphate bond, representing for example ATP as ADP~P. It was not for this work, however, that Lipmann shared the 1953 Nobel Prize in Physiology or Medicine with Hans Krebs but for his discovery in 1947 of coenzyme A and its importance for intermediary metabolism. While working on the role of phosphate in cell metabolism, Lipmann discovered that a heat-stable factor was acting as a carrier of acetyl (CH3CO-) groups. It could be replaced by any other known cofactor. Lipmann eventually isolated and identified what he termed "cofactor A," or CoA, showing that it contained vitamin B2. He also showed that the two-carbon compound in the Krebs cycle that joined with oxaloacetic acid to form citric acid was in fact acetyl CoA. The coenzyme was soon shown to have wider applications than the Krebs cycle, when in 1950 Feodor Lynen found that it played a key role in the metabolism of fats.

Source

John Daintith, et al. eds. Biographical Encyclopedia of Scientists, 2nd ed. Bristol and Philadelphia: Institute of Physics Publishing, 1994.
Hazel Muir, ed. Larousse Dictionary of Scientists. New York: Larousse, 1994.

Additional Readings or Websites

Nobel e-MuseumNobel e-Museum

Back to top

Lynen, Feodor (1911-1979) German biochemist

Lynen received his Ph.D. from the University of Munich under Heinrich Wieland in 1937. That same year he married Wieland's daughter. He was appointed to the faculty at Munich in 1942, and became professor of chemistry in 1947. In 1954 he became director of the Max Planck Institute for Cell Chemistry in Munich.

In 1950 Lynen showed that coenzyme A (CoA) played the central role in the breakdown of fats in the body. Fats were first broken down by the enzyme lipase into a number of free fatty acids. It had been shown in 1904 that these were then degraded two carbon atoms at a time. Lynen demonstrated that this was done by coenzyme A, which combined with the fatty acid and formed, after a number of intermediary steps, acetoacetyl coenzyme A at one end of the chain. For his work on fatty acid metabolism and on cholesterol, he shared the 1964 Nobel Prize in Physiology or Medicine with Konrad Bloch.

Source

John Daintith, et al. eds. Biographical Encyclopedia of Scientists, 2nd ed. Bristol and Philadelphia: Institute of Physics Publishing, 1994.
Hazel Muir, ed. Larousse Dictionary of Scientists. New York: Larousse, 1994.

Additional Readings or Websites

Nobel e-Museum

Back to top

Nirenberg, Marshall (1927-) American biochemist and molecular biologist

The son of a land developer, Nirenberg was born in New York City but grew up in Orlando, Florida. Nirenberg pursued his early interest in biology and chemistry at the University of Florida, and received his Ph.D. in 1957 at the University of Michigan for his work on the enzyme transport mechanism for the sugar hexose in ascites tumor cells.

Nirenberg then moved to the National Institutes of Health (NIH) in Bethesda as a postdoctoral fellow to work with DeWitt Stetten, Jr. During his collaboration with William Jakoby on the genetic control of enzymatic induction, Nirenberg became interested in protein synthesis in a cell-free system. He was appointed a staff scientist at NIH in 1960. In a series of experiments conducted with Johann Heinrich Matthaei, a postdoctoral fellow from Germany, Nirenberg discovered in 1961 that poly-U, a synthetic RNA polymer of polyurdylic acid, functions as a template for producing a protein composed of the single amino acid phenylalanine. UUU became the first word of the genetic code deciphered. It took five years to solve the entire code for twenty amino acids. In this phase of the work Nirenberg faced fierce competition from the eminent scientist Severo Ochoa, and NIH scientists teamed up to help him showing a remarkable esprit de corps. Among them, Philip Leder, Maxine Singer and Leon Heppel assisted Nirenberg by devising enzymatic methods for synthesizing trinucleotides of known sequences. Nirenberg shared the 1968 Nobel Prize in Physiology or Medicine with Har Gobind Khorana and Robert W. Holley for their investigations into the genetic code. Since then, Nirenberg has been exploring the new scientific frontier of neurobiology at NIH.

Source

Buhm Soon Park and Victoria Harden, "Marshall Nirenberg," Nature Encyclopedia of Life Sciences

Additional Readings or Websites

Profiles in Science
Nobel e-Museum

Back to top

Prusiner, Stanley B. (1942-) American neurologist

Prusiner received his A.B. in chemistry in 1964 and his M.D. in 1968 from the University of Pennsylvania. Following his internship at the University of California, San Francisco, he came to the National Heart and Lung Institute in 1969 as a Clinical Associate. Working in Earl Stadtman's laboratory, he learned various aspects of the research process in biochemistry: developing assays, purifying macromolecules, documenting a discovery by many approaches, and writing clear manuscripts describing what is known and what remains to be investigated. As he later recalled, his three years at NIH were critical in his scientific education.

In 1972, Prusiner began a residency at the University of California, San Francisco in the department of neurology, where he became interested in a "slow virus" infection called Creutzfeld-Jakob disease (CJD) and the seemingly related diseases—kuru of the Fore people of New Guinea and scrapie of sheep. Prusiner joined the faculty there in 1974 and continued his studies on scrapie. Finally in 1982, he published a paper in which he claimed to have isolated the scrapie-causing agent. This agent, which he termed a "prion," was not like other known pathogens, such as viruses and bacteria, because it consisted only of protein and lacked the nucleic acid having genetic information. Prusiner's paper immediately set off a firestorm of criticism, especially from virologists, but by the mid 1990s, his discovery became widely accepted. For this work, he received the 1997 Nobel Prize in Physiology or Medicine.

Source

Nobel e-Museum

Additional Readings or Websites

NINDS:

Back to top

Stetten, DeWitt, Jr. (1909-1990) American biochemist and medical educator

DeWitt Stetten, Jr., informally known as Hans, received his A.B. from Harvard in 1930 and his M.D. from the Columbia University College of Physicians and Surgeons in 1934. After his internship and residency at Bellevue Hospital in New York, he returned to Columbia University to study biochemistry. He received his Ph.D. in 1940. Stetten had taught biochemistry at Columbia for nine years before he was appointed assistant professor in biological chemistry at the Harvard Medical School in 1947. The following year he accepted the position of chief of the division of nutrition and physiology of the Public Health Research Institute of New York City.

In 1954 Stetten came to the National Institute of Arthritis and Metabolic Diseases as director of its intramural research program. Eight years later he left NIAMD to become the first dean of the Rutgers Medical School, but he came back to NIH in 1970 as director of the National Institute of General Medical Sciences. He also served as NIH deputy director for science from 1974 to 1979, and was instrumental in creating the NIH's Museum of Medical Research in 1987. The museum was named after him.

His main scientific contribution was in the study of gout, a metabolic disease marked by a painful inflammation of the joints, but perhaps he is best known for his leadership in the drafting of guidelines on genetic engineering research in 1976. He was a member of the National Academy of Sciences.

Source

NIH Almanac

Additional Readings or Websites

J. Edwin Seegmiller. "DeWitt Stetten, Jr." Memoirs of the National Academy of Sciences 71 (1997): 332-45.
Victoria A. Harden. "Present at the creation. The first five years of the Stetten Museum." Caduceus 8 (1992): 46-53.
A finding aid is located at the National Library of Medicine

Back to top

Vagelos, P. Roy (1929-) American biochemist and businessman

Vagelos received his A.B. from the University of Pennsylvania in 1950 and his M.D. from Columbia University in 1954. After his internship and residency at the Massachusetts General Hospital in Boston, he came to the National Heart Institute in 1956. There he launched a new career as a research scientist under the guidance of the biochemist Earl Stadtman. He was a co-discoverer of the role of the acetyl carrier protein in fatty acid synthesis.

Vagelos left NIH in 1966 to assume the chairmanship of the department of biological chemistry in the School of Medicine at Washington University, St. Louis. He continued to work on fatty acid biosynthesis and metabolism and expanded his research to the synthesis of complex lipids and the role of cholesterol in the biochemistry of the cell. In 1975, Vagelos was persuaded to lead basic research at Merck & Company, starting a new career in drug discovery. Later he served as chairman and CEO of this company. Under his direction, the company expanded its philanthropic efforts as well as its pharmaceutical research. He is a member of the National Academy of Sciences and an inductee of the National Business Hall of Fame.

Source

Louis Galambos and Jane Eliot Sewell. Networks of Innovation: Vaccine Development at Merck, Sharp & Dohme, and Mulford, 1895-1995. Cambridge: Cambridge University Press, 1995.

Additional Readings or Websites

P. Roy Vagelos and Louis Galambos. Medicine, Science and Merck: The First Three Careers of Roy Vagelos. Cambridge: Cambridge University Press, 2003.

Back to top

Van Niel, Cornelis Bernardus Kees (1897-1985) Dutch microbiologist.

Trained under Albert Kluyver in Delft, the Netherlands, van Niel moved to America in 1929 to work at the Hopkins Marine Station of Stanford University. He made an important contribution to the study of photosynthesis in bacteria. He showed that the green and purple sulfur bacteria do not use water as the exclusive hydrogen donor (as in plants), but use hydrogen sulfide and other reduced sulfur compounds instead.

Source

John Daintith, et al. eds. Biographical Encyclopedia of Scientists, 2nd ed. Bristol and Philadelphia: Institute of Physics Publishing, 1994.
Hazel Muir, ed. Larousse Dictionary of Scientists. New York: Larousse, 1994.

Additional Readings or Websites

H. A. Barker and Robert E. Hungate. "Cornelis Bernardus van Niel." Biographical Memoirs of the National Academy of Sciences 59 (1990): 388-423.

Back to top

Warburg, Otto Heinrich (1883-1970) German biochemist.

Educated at Berlin and Heidelburg, Warburg worked at the Kaiser Wilhelm Institute (later the Max Planck Institute) in Berlin from 1913, becoming its director in 1953. He was the first to discover the important role of iron, in association with oxidase enzymes, in nearly all cells. In 1926 he demonstrated that oxygen uptake by yeast is inhibited by carbon monoxide. He is also known for the invention of the gas manometer, named after him, which measures metabolic reactions by the amount of oxygen or carbon dioxide taken up or released. The "Warburg" apparatus became essential in the investigation of metabolic pathways and was used in a number of important discoveries, including Hans Krebs's citric acid cycle. Warburg was awarded the 1931 Nobel Prize in Physiology or Medicine, but as a Jew was prevented from accepting it by Hitler.

Source

John Daintith, et al. eds. Biographical Encyclopedia of Scientists, 2nd ed. Bristol and Philadelphia: Institute of Physics Publishing, 1994.
Hazel Muir, ed. Larousse Dictionary of Scientists. New York: Larousse, 1994.

Additional Readings or Websites

Nobel e-Museum

Back to top

Winogradsky, Sergey Nikolaevich (1856-1953) (also spelled Vinogradsky) Russian microbiologist

Winogradsky received his M.A. from St. Petersburg University in 1884, and became affiliated with the Institute of Experimental Medicine at St. Petersburg (1891-1912). Later he directed agricultural research in the Ukraine, and was appointed director of agricultural microbiology at the Pasteur Institute in 1922. His most important studies include the morphological variability of microbes, the discovery of microbes' capacity for chemosynthesis, and the creation and development of the bases for ecological and soil microbiology.

Source

James F. Mauer, et al., eds. Concise Dictionary of Scientific Biography. New York: Charles Scribner & Sons, 1981.

Back to top